NASA TECH BRIEF

NASA Pasadena Office

Compact Telemetry Package for Remote Monitoring of Neuron Responses in Animals

The problem:

The typical instrumentation used in the study of neuron responses in laboratory rats includes a number of wires which connect electrodes implanted in the animals' brains with signal-processing equipment. The cumbersome wires inhibit the animals' natural movements in response to different stimuli.

The solution:

A new battery-powered telemeter which includes an FM transmitter is light enough to be mounted on a rat's head. The rat thus has complete freedom of movement while its neuron responses are transmitted to a receiver in the laboratory.

How it's done:

Integrated circuits have been used to construct a PAM-FM telemeter. Signals from electrodes (see Figure 1) implanted in the animal's brain are amplified, multiplexed (time shared), and transmitted. The receiving station, located in the laboratory, contains a receiver, a discriminator, and a demultiplexer.

An important part of the package is a specially-designed epoxy-fiberglass housing. The housing, as shown in Figure 2, was designed to avoid sharp corners. Its dimensions are 38 mm (1.5 in.) long, 33 mm (1.3 in.) wide, and 14 mm (0.56 in.) thick. The top and bottom surfaces of the housing are flat; the bottom is provided with an opening for the passage of the connectors which join the multiplexer with the implanted electrodes. The housing also includes a battery module which is removable for the replacement of battery cells.

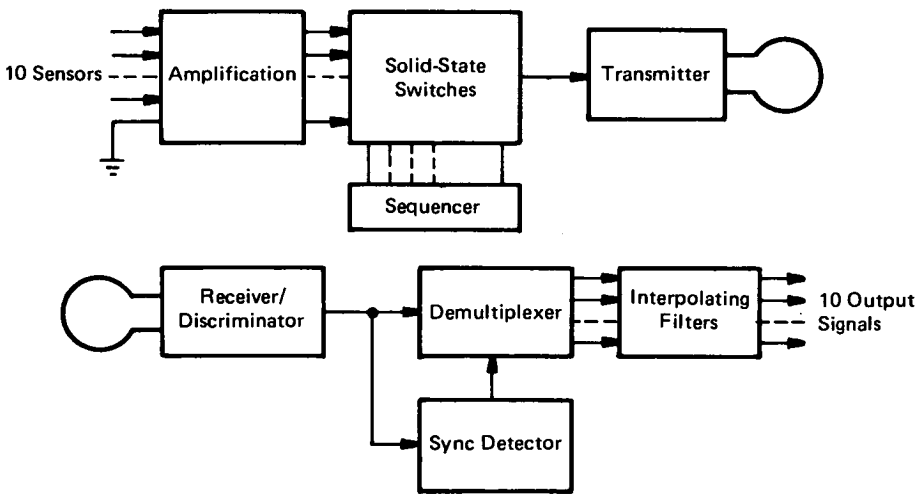

Figure 1. Telemetry System Block Diagram

(continued overleaf)

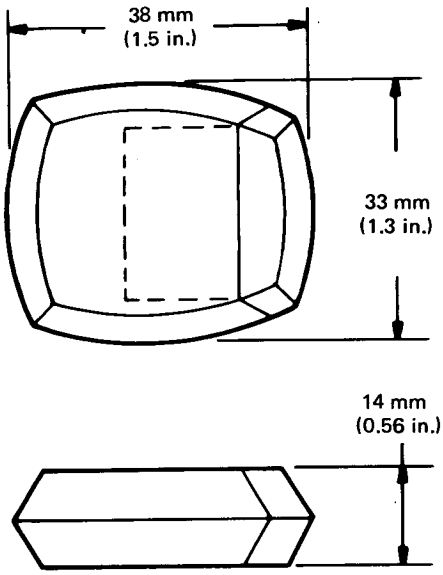

Figure 2. Transmitter Circuit Housing

Notes:

1. This type of package construction may also be applied to monitor blood pressure, body temperature, and different muscular signals.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   NASA Pasadena Office
   4800 Oak Grove Drive
   Pasadena, California 91103
   Reference: TSP74-10103

Patent status:

NASA has decided not to apply for a patent.

Source: Charles D. Baker of
Caltech/JPL
under contract to
NASA Pasadena Office
(NPO-11887)